



[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2012-0060; Directorate Identifier 2012-NE-02-AD]

RIN 2120-AA64

Airworthiness Directives; Pratt & Whitney (PW) Division Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: We propose to adopt a new airworthiness directive (AD) for certain PW4000 series turbofan engines. This proposed AD was prompted by reports of 3rd and 4th stage vane fractures in the low pressure turbine (LPT) of certain PW4000-94" and PW4000-100" turbofan engines. These fractures caused an uncontained engine failure, an LPT case puncture, and multiple in flight shutdowns. We are proposing this AD to prevent 3rd and 4th stage vane fractures in the LPT, which could damage the LPT rotor and lead to an uncontained engine failure and damage to the airplane.

DATES: We must receive comments on this proposed AD by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE Federal Register].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this proposed AD, contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; phone: 860-565-4321. You may review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803. For information on the availability of this material at the FAA, call 781-238-7125.

Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov>; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Office (phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: James Gray, Aerospace Engineer, Engine Certification Office, FAA, 12 New England Executive Park; phone: 781-238-7742; fax: 781-238-7199; e-mail: james.e.gray@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under the ADDRESSES section. Include “Docket No. FAA- 2012-0060; Directorate Identifier 2012-NE-02-AD” at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed AD because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.

Discussion

We have received reports of 3rd and 4th stage vane fractures in the LPT of certain PW4000-94" and PW4000-100" turbofan engines. These fractures caused an uncontained engine failure, an LPT case puncture, and multiple in flight shutdowns. We have identified four primary root causes for LPT vane failures:

1. Inadequate retention of the vane in the case due to dimensional tolerances which causes 3rd stage vane liberations. This AD requires dimensional inspections of the 3rd stage vanes at their retention points and case at LPT assembly after overhaul.

2. Non-uniform airfoil fillet radii found on vanes produced prior to 2005 which causes 4th stage vane fractures. This AD removes these vanes, identified by the casting identifier, from service at the next LPT overhaul.

3. Multiple strip-and-recoat repairs of the 4th stage vanes which degrade the structural integrity of the vanes and cause 4th stage vane fractures. This AD removes from service 4th stage vanes with multiple strip-and-recoat repairs. This AD also prohibits approving for return to service any 4th stage vane with more than one strip-and-recoat repair.

4. Aerodynamic excitation of the vanes which causes 4th stage vane fractures. The excitation is attributed to the rotor assembly methods for the upstream rotor stages. This AD requires reassembling the 2nd stage HPT blades at the next HPT overhaul and the 3rd stage LPT blades at the next LPT overhaul, using the latest assembly technique.

The actions proposed in this AD are intended to address each of the root causes identified above. This condition, if not corrected, could result in 3rd and 4th stage vane

fractures in the LPT, which could damage the LPT rotor and lead to an uncontained engine failure and damage to the airplane.

FAA's Determination

We are proposing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type designs.

Proposed AD Requirements

This proposed AD would require dimensional inspections of 3rd stage vanes and the rear turbine case. This AD also requires inspection of 4th stage vanes at the next LPT overhaul and removal of vanes with non-conforming airfoil fillet radii and vanes with more than one strip and recoat repair. This AD also requires disassembly and reassembly of the 2nd stage HPT rotor and 3rd stage LPT rotor at the next HPT and LPT overhauls.

Costs of Compliance

We estimate that this proposed AD affects 807 engines installed on airplanes of U.S. registry. We estimate that it would take 2 work-hours per engine to perform the LPT 3rd stage vane cluster assembly and rear turbine case inspections. The average labor rate is \$85 per work-hour. We expect that approximately 1,870 LPT 4th stage vane cluster assemblies will be found with the non-conforming casting identification. Replacement parts cost about \$4,854. We estimate that limiting 4th stage vanes to one strip-and-recoat repair will remove 1/3 of the useful part life expectancy of the vanes on 323 engines at a prorated cost of \$71,000 per engine. We do not associate any additional costs with reassembling 2nd stage HPT blades and 3rd stage LPT blades using the latest procedures as this is done at overhaul. Based on these figures, we estimate the cost of the proposed AD on U.S. operators to be \$32,147,170.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

We determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

Pratt & Whitney Division: Docket No. FAA-2012-0060; Directorate Identifier 2012-NE-02-AD.

(a) Comments Due Date

We must receive comments by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE Federal Register].

(b) Affected ADs

None.

(c) Applicability

This AD applies to the following Pratt & Whitney Division (PW) turbofan engines:

(1) PW4000-94" engine models PW4050, PW4052, PW4056, PW4152, PW4156, PW4650, PW4060, PW4060A, PW4060C, PW4062, PW4062A, PW4156A, PW4158, PW4160, PW4460, and PW4462 including models with any dash number suffix.

(2) PW4000-100" engine models PW4164, PW4164C, PW4164C/B, PW4168, PW4168A, PW4164-1D, PW4164C-1D, PW4164C/B-1D, PW4168-1D, PW4168A-1D, and PW4170.

(d) Unsafe Condition

This AD was prompted by reports of 3rd and 4th stage vane fractures in the low pressure turbine (LPT) of certain PW4000-94" and PW4000-100" turbofan engines. These fractures caused an uncontained engine failure and an LPT case puncture, and resulted in multiple in flight shutdowns. We are issuing this AD to prevent 3rd and 4th stage vane fractures in the LPT, which could damage the LPT rotor and lead to an uncontained engine failure and damage to the airplane.

(e) Compliance

Comply with this AD within the compliance times specified, unless already done.

(1) At the next LPT overhaul do the following:

(i) Remove LPT 4th stage vanes from service if more than one strip and recoat repair has been performed, or if the number of strip and recoat repairs are unknown. After the effective date of this AD, do not install or reinstall into any engine any LPT 4th stage vanes that have had more than one strip and recoat repair.

(ii) Re-assemble the 3rd stage LPT rotor blades using a method that will alternate heavy blades next to light blades and balance blades of similar weights 180 degrees across the rotor.

(iii) Inspect the LPT 3rd stage vane cluster assembly. Ensure adequate engagement between the vane cluster assembly and the rear turbine case.

(iv) Examine the vane and airseal engagement slots on the rear turbine case where the 3rd stage vane is installed. Ensure adequate engagement exists for assembly of the 3rd stage vane cluster assembly and the rear turbine case.

(v) Inspect the 44 LPT 4th stage vane cluster assemblies PN 52N774-01 for casting identification “51N554AT 1447 2S1C1” and PN 52N674-01 for casting identification “51N454AT 655 2S1C1.” Remove the vane cluster assembly from service if either of these casting identifications is found.

(2) At the next HPT overhaul, re-assemble the 2nd stage HPT rotor blades using a method that will alternate heavy blades next to light blades and balance blades of similar weights 180 degrees across the rotor.

(f) Alternative Methods of Compliance (AMOCs)

The Manager, Engine Certification Office, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request.

(g) Related Information

(1) Guidance on the assembly method of paragraph (e)(1)(ii) of this AD can be found in the applicable engine manual: PN 50A605 or PN 50A822 Task 72-53-03-440-001, dated September 15, 2006; or PN 50A443 Task 72-53-03-440-001, dated May 1, 2007; or PN 51A342 Task 72-53-03-440-002-003, dated September 15, 2006.

(2) Guidance on the dimensional inspection of paragraph (e)(1)(iii) of this AD can be found in the Clean Inspect Repair Manual, PN 51A357 Task 72-53-23-200-004, dated January 15, 2011.

(3) Guidance on the dimensional inspections of paragraph (e)(1)(iv) of this AD can be found in the Clean Inspect Repair Manual, PN 51A357 Subtask 72-53-17-220-060, dated September 15, 2009.

(4) Guidance on the assembly method of paragraph (e)(2) of this AD can be found in the applicable engine manual: PN 50A605, PN50A822, or PN50A443 Task 72-52-02-440-001, dated May 1, 2010; or PN 51A342 Task 72-52-02-440-001, dated September 15, 2011.

(5) For more information about this AD, contact James Gray, Aerospace Engineer, Engine Certification Office, FAA, 12 New England Executive Park; phone: 781-238-7742; fax: 781-238-7199; e-mail: james.e.gray@faa.gov.

(6) For service information identified in this AD, contact Pratt & Whitney, 400 Main St., East Hartford, CT 06108; phone: 860-565-4321. You may review copies of the referenced service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803. For information on the availability of this material at the FAA, call 781-238-7125.

Issued in Burlington, Massachusetts, on February 27, 2012.

Peter A. White,
Manager, Engine & Propeller Directorate,
Aircraft Certification Service.

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